

Winter 2011

Volume 24 - No 1

**ISSN 1042-198X
USPS 003-353**

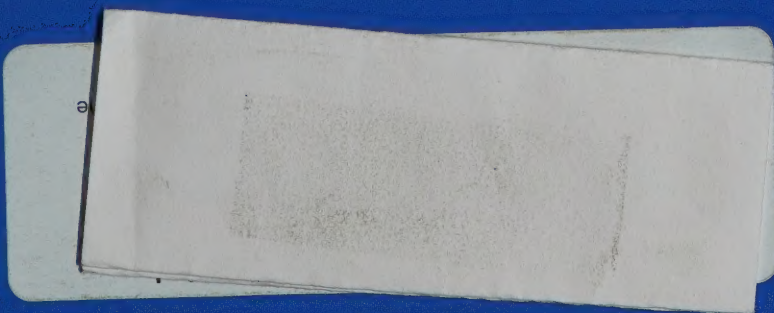
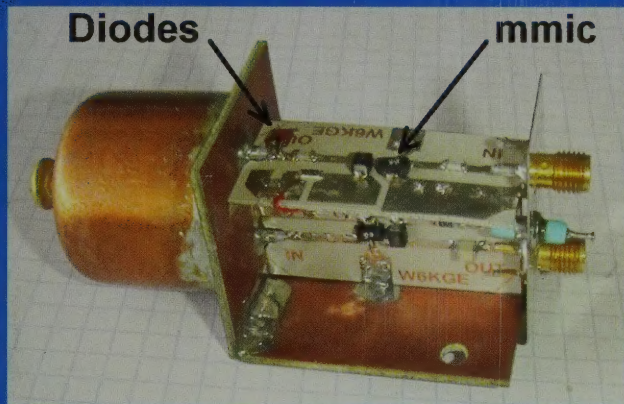
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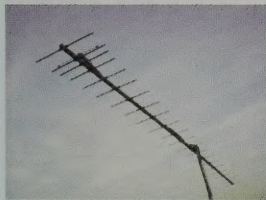
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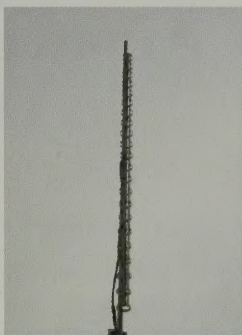
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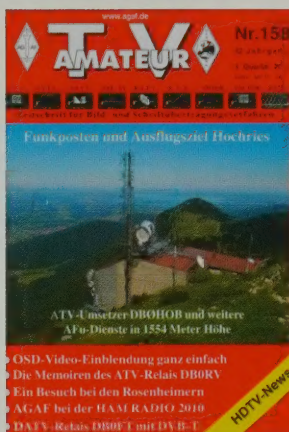


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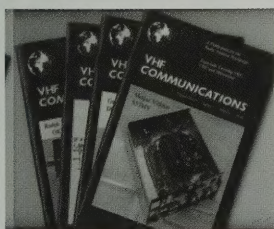
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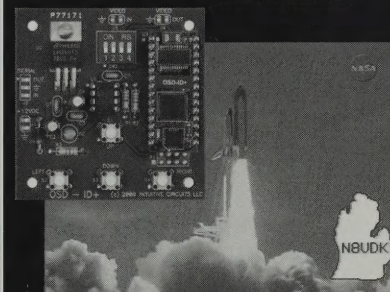
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Published by
ATV Quarterly

Publisher/Managing Editor
Bill Brown - WB8ELK
Publisher/Technical Editor
Mike Collis - WA6SVT

Editor
Art Towslee WA8RMC

Art Director
Jeff Brown - N8UEJ

Subscriptions / Advertising
Mike Collis WA6SVT
P.O. Box 1594
Crestline, CA 92325
(909) 338-6887 - voice
email: wa6svt@atvquarterly.com

Article Submissions / Ad copy
Bill Brown WB8ELK
107 Woodlawn Dr.
Madison, AL 35758
(256) 772-6000 - voice
email: wb8elk@atvquarterly.com

Website:
<http://www.atvquarterly.com>

Amateur Television Quarterly (ISSN 1042-198X) is published quarterly, in January, April, July, and October for \$20.00 per year by ATV Quarterly Magazine, P.O. Box 1594, Crestline, California 92325. Periodicals Postage Paid at Crestline, CA and additional mailing offices. POSTMASTER:

Send address changes to:
Amateur Television Quarterly,
P.O. Box 1594, Crestline, CA 92325.

Amateur Television Quarterly is available by subscription for \$20.00/yr in the USA; \$22.00/yr in Canada; \$29.00/yr elsewhere. Single issues \$5.50/USA; \$6.00/Canada; \$8.00 elsewhere.

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Sync Buzz Editorial

- Bill Brown WB8ELK and Mike Collis WA6SVT

ATV Spectrum Landgrab

It seems like it is easier for some companies to pay lawyers and lobbyists to grab our amateur radio 70cm ATV spectrum than it is to hire RF engineers to design TV transmitters on another frequency range. Is it really that hard to find talented RF engineers?

FCC Item:

WP Docket No. 08-63, ReconRobotics Inc. ATV outfitted part 90 robot scouts for police and homeland security is back in the news. As most of you know the ARRL, ATN, ATCO, ATVQ and many other ham groups had commented and objected to allowing the 1 watt (peak sync) three channel 430-450 MHz band robots to be deployed.

The FCC had approved the request but additional objections and challenges were made by the league and the ham radio community. The FCC on April 13th modified the report and order (released April 15th) to reflect some of the concerns while tossing others, this modification is retroactive.

The main changes are in both the FCC certification tags on the devices and operation manuals to say this device cannot interfere with and must accept interference from both federal and non federal (hams) licensed stations in the 430-450 MHz band.

At least that should stop law enforcement from coming to your house and trying to arrest you for causing QRM to their operations and allow us some protection if we get QRM. The channels are as follows, an agency's first channel allocation is 436-442 MHz with visual carrier at 437.25 MHz. The second channel allocation if they already have a channel 1 device is 442-448 MHz with video carrier at 443.25 MHz, and the third channel if the agency already has devices on channels 1 and 2 is 430-436 MHz visual carrier on 431.25 MHz.

- Bill and Mike

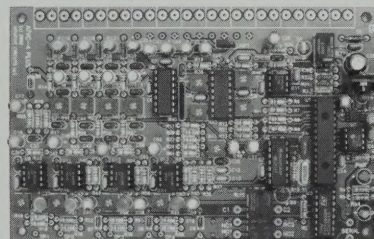
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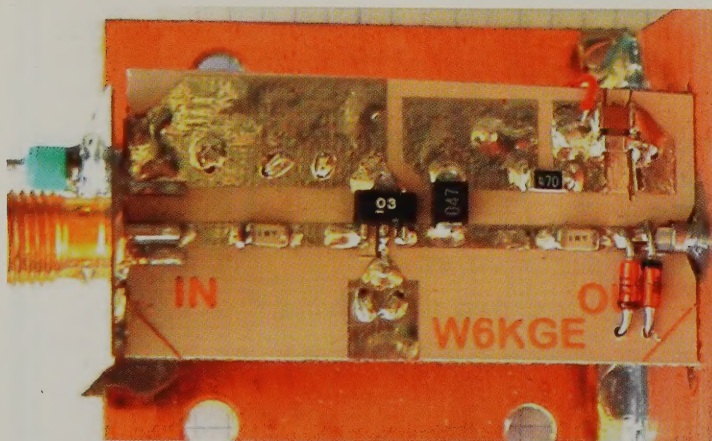
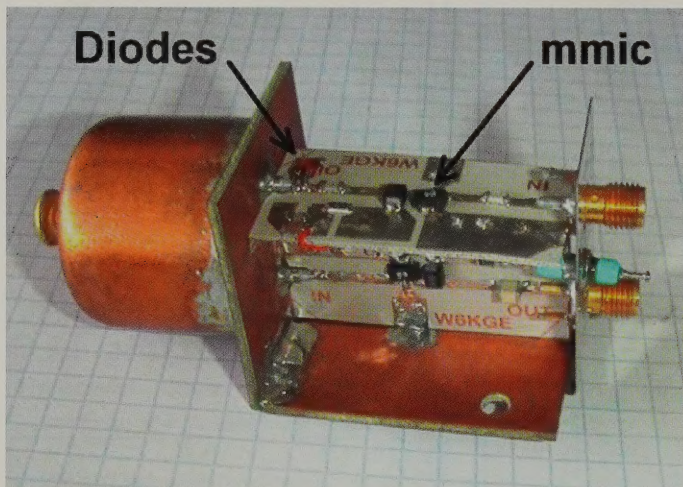
A TRIPLER FOR 3.4 GHZ FM ATV

By Bob Miller, W6KGE

If we build or modify an FM ATV transmitter for 1.2 GHz, and then make a few 'tweaks' to get it to tune to 1.13 GHz, and then add a tripler... Hey! We've got a 3.4 GHz FM ATV transmitter!

Ok, so how do we build a simple tripler that works with our low power transmitter?

Let me give you a starting point. Modifications need to be made to match the input and output signal level requirements, so feel free to experiment with parts values and amplifier types. Remember, we are working with FM here, and by it's very nature the circuit does not have to be 'linear' so you can be a little 'sloppy'.



That said, we are working with components at 3.4 GHz. We want them to be stable. Things like extremely short ground paths for the MMIC's and

the use of surface mount components are important considerations.

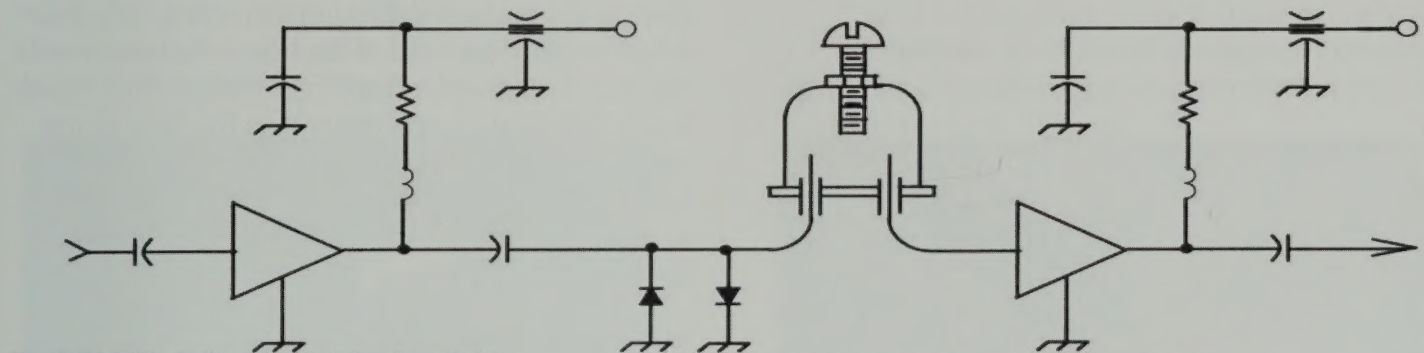
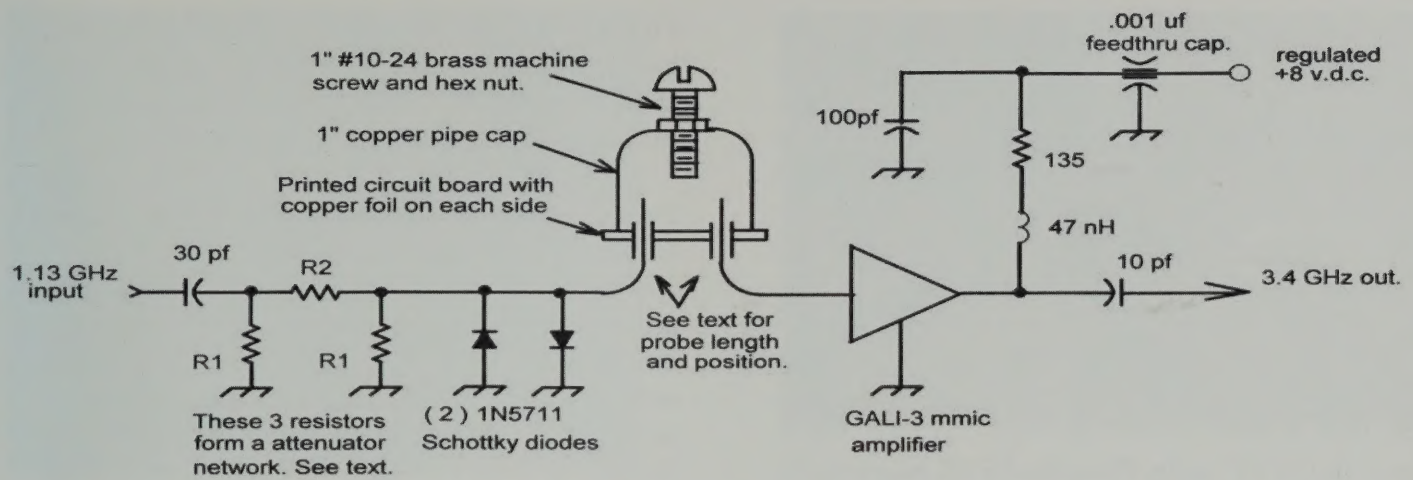
The photos show the completed tripler with the location of the Schottky diodes and MMIC on the top 1.13 GHz circuit board. An opposite close up view shows the PCB and more clearly illustrates the diode placement and probe entry. The Schottky diode output is fed into the filter. The 3.4 GHz filter output is amplified by the bottom board. The bottom board is mounted at 90 degrees to the top board.

Let's review the schematic diagrams. I've drawn two arrangements for this article. The top is for 1.13 GHz transmitters with power outputs of +20 dBm or greater. The bottom is for those with less than +10 dBm. The photo illustrates the +10dBm arrangement with two MMIC's.

Depending on the output power of the transmitter, either add some amplification or reduce the power with a 50 ohm pad. The "R1" and "R2" resistors shown on the top schematic are chosen to provide the necessary attenuation. The *ARRL Handbook* has been publishing a table of the values of these resistors for many years. (1)

I used GALI-3+ MMIC amplifiers for this project because I had some in my 'junk box' and they provided the needed gain and output levels. However, a wide range of MMIC's are available so review the spec's and choose some that will work for you. (2)

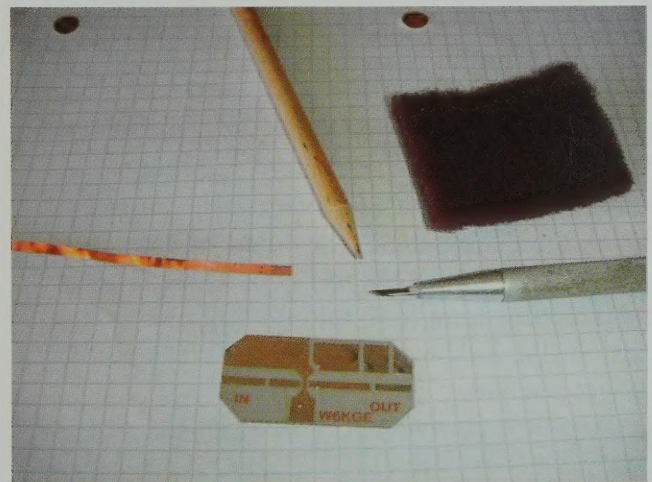
A significant amount of information is available regarding frequency multiplication using diodes of various types. In addition, MMIC's even work as multipliers.(3) I had some 1N5711 Schottky diodes in my 'junk box' so I used them. Depending on the diodes chosen, other minor factors are that the diodes begin to produce nice harmonics somewhere near the +12 to +16 dBm range at the junction of the two diodes so plan the design accordingly.



The pipe cap filter insertion loss and bandwidth vary depending on probe lengths. Typical losses are -2 to -4 dB for bandwidths that pass the desired frequencies and attenuate unwanted harmonics to acceptable levels. I found that by using UT-085 or UT-141 rigid coax for the probes and carefully positioning the RF pc boards, the center conductor can be pulled in and out to 'fine tune' the loss and bandwidth.

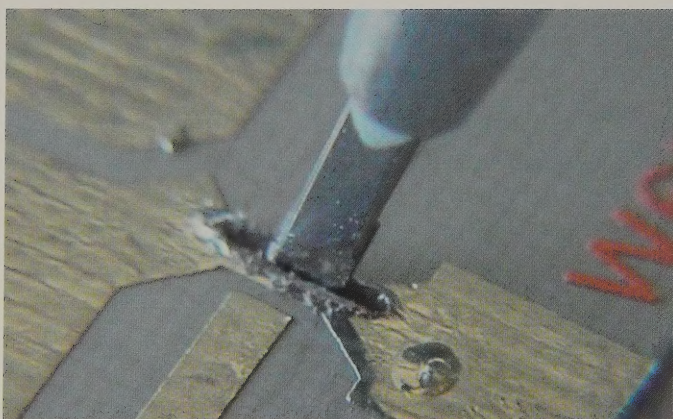
Start your project by assembling two circuit boards for the portions of the circuit before and after the filter.

I use 0.030 Taconic RF-35 which is a 'microwave' type PTFE material, rather than the standard fiberglass PC board for the circuit. It's not primarily because of the 'losses' in fiberglass at microwave frequencies but because it cuts well with a knife! I like to make my own pc boards. Commercially produced microwave boards are designed with lots of 'through plated' holes for low impedance grounding. Plating 'homebrew' pc boards is not practical so as an alternative, generally use 'z-wire' grounding.(5)

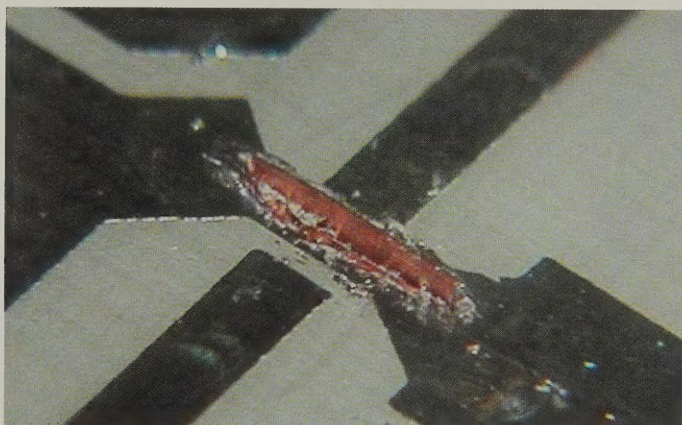


Since high gain, microwave MMIC's need exceptional ground paths for stability, I use the following method.

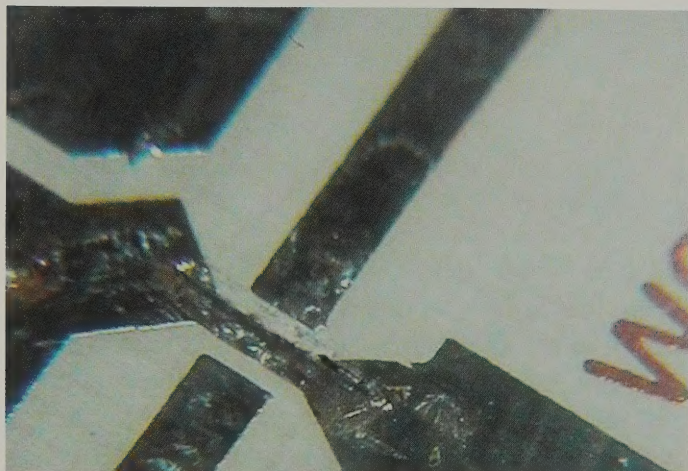
I use the 'tools' in the following photo:
From the top: A wooden dowel sharpened like a pencil to use as a 'burnishing' tool. An abrasive pad, like 'Scotchbrite' is used to clean the copper foil just before soldering. Use an 'Exacto' knife with a very small blade to cut a piece of 0.001"



copper foil, 0.10" wide. Place the PTFE board on a hard surface and make a series of light then heavier cuts with the small 'Exacto' knife until it's cut completely through the board for grounding. The slot shown in the photo is approximately 0.15" long.



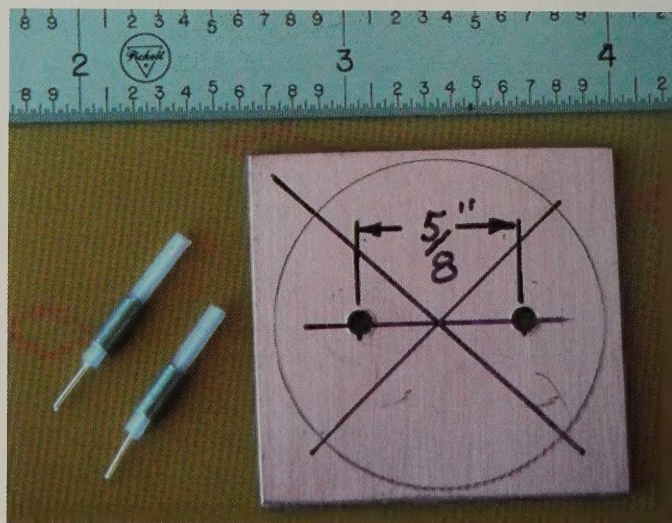
Measure and insert a freshly cleaned piece of foil into the slot. Adjust the amount of foil that protrudes through the PTFE board by using a shim of desired thickness under the board leaving the area under the slot for the foil to protrude. Then, using the burnishing tool, fold the foil over and burnish it flat. Solder it in place, and clean the board with flux remover.



Finish the ground by soldering the foil to the backside of the double copper sided board. The installation should be flat enough to allow the MMIC to be soldered to the board later.

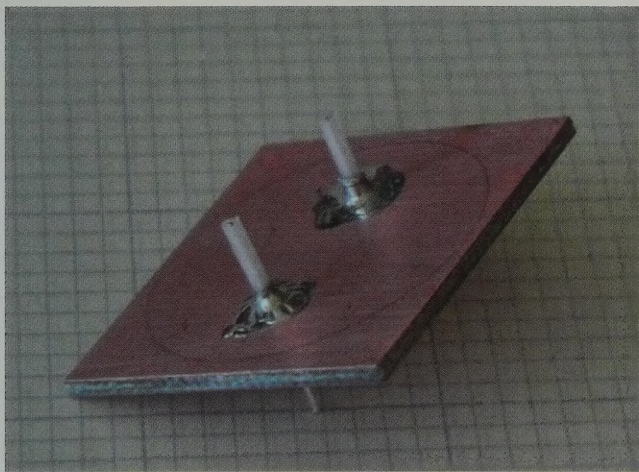
For the less critical grounds drill holes for 'z-wires' at other board locations. Use a # 26 or #28 fine stranded silver plated Teflon insulated wire for this process rather than the solid wire that is often used. Tin the end of a 5" piece of the stranded wire, and strip all of the insulation, leaving the remainder as loose strands. Then feed the tinned end of the wire through the hole leaving a very short length of the un-tinned end. Spread the un-tinned ends and solder them to the board. Next, cut the wire to a very short length on the other side of the board. Flatten, spread the strands and solder them to the board. This leaves a very flat, slight bump rather than the large bump caused when solid wire is used. The relatively flat bump allows a heat sink or solid metal plate attach to the board with screws without unduly flexing the board.

The filter assembly is next. An excellent article has been written regarding 'pipe cap' filters.(4) This is a widely available reference published by the ARRL. I encourage you to read it rather than spending pages here on details. Here are some items that are not discussed.



Start by installing the probes for the pipe cap filter using double sided copper fiberglass pc board. Cut the outer coaxial shield just long enough to solder to both sides of the double sided PC board.

Next, the pipe cap is drilled and tapped to for a 1" long #10-24 brass round head machine screw. A



#10-24 hex nut is used to 'jam' the brass machine screw. The screw and nut will be installed later. (The nut is tightened against the copper cap after the screw is adjusted to tune the filter).



The open ends of pipe caps are often irregular. They can be 'squared up' by placing a piece of medium grit sandpaper on a flat surface and working the pipe cap back and forth to sand the opening flat. Use a piece of sandpaper or a 'Scotchbrite' type of pad to clean the inside and outside of the pipe cap. Position it over the probes on the pc board being careful to correctly center it. Use a metal 'C-clamp' to keep the pipe cap and pc board together.

Use 'vise-grip' pliers and bench vise to hold the assembly while heating the pipe cap (NOT THE PC BOARD) with a propane torch. Check temperature by touching the joint between the pipe cap and pc board with solder. As soon as the solder begins to flow, remove heat from the pipe cap and run the tip of the solder around the seam between it and the board. It's not necessary to use a lot of solder here. Use just enough to completely solder the perimeter of the cap to the board. Then use a wet cloth to cool the pipe cap. (Remember, too much heat for too

long will damage the pc board and may 'unsolder' the probes).

Next, as shown in the photo, the RF circuit boards are attached by soldering the copper ground plane side of the boards to the filter and soldering the probes to the strip lines on the RF boards.

Finally, supply DC power and tune the filter. A spectrum analyzer is best for this. With the filter properly adjusted the tripler provides a 'clean' output with unwanted harmonics down at least -40 dB from the third harmonic.

(1) Table 7.56, Pi-Network Resistive Attenuators (50 ohm), *The ARRL Handbook for Radio Communications 2006*, pp 7.47.

(2) www.minicircuits.com and others.

(3) J. Davey, "Frequency Multipliers Using MMICs", *UHF/Microwave Projects Manual*, Vol. 1, pp 5-13 to 5-15.

(4) K. Britain, "Cheap Microwave Filters From Copper Plumbing Caps" *The ARRL UHF/Microwave Projects Manual*, Vol. 1, pp 6-6 to 6-7.

(5) 'z-wire grounding' = Holes are drilled through the pc board at closely spaced intervals and as close to components that require grounding as possible. Bare copper wire is then pushed through the holes and soldered from the top side of the board to the bottom continuous grounding foil.



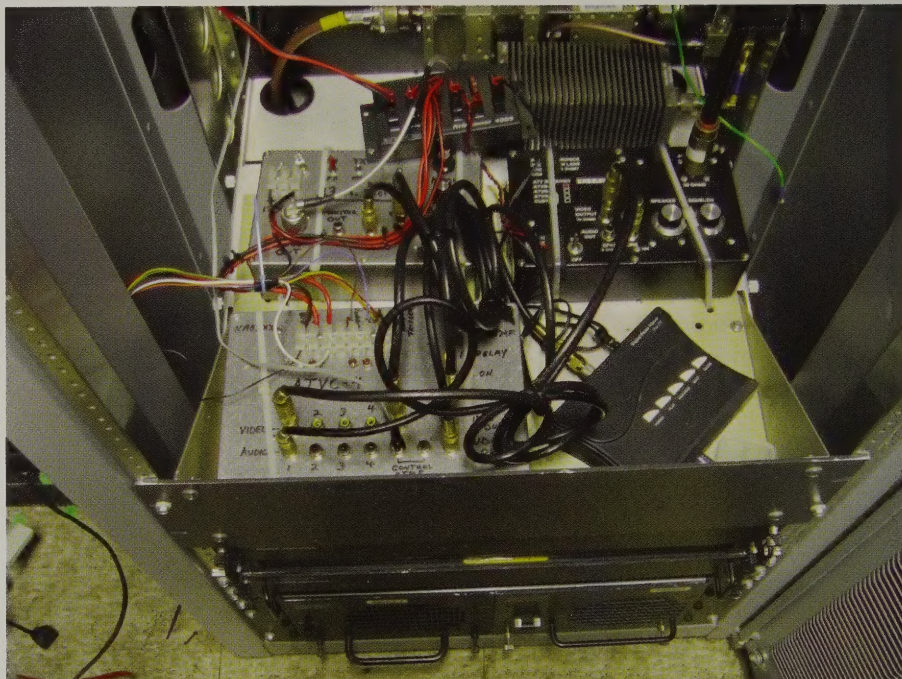
N8OBU Crossband ATV Repeater

- Bryan Dygert KC8LMI

The N8OBU ATV repeater is located 15 miles southwest of Lansing, Michigan. It was built and is maintained by Bruce KA8ZXX, Bryan KC8LMI, and Mike N8OBU. The repeater antennas are on Mike's 185 foot Rohn 25G tower in his backyard. The ATV repeater is co-located with his 444.575 and 927.525 FM voice repeaters. The input is 439.250 lvsb horizontal omni and the output is 910.250 vertically polarized running 400 watts PEP to an 8dB commercial 900MHz stick at 170 feet, fed with 1-1/4" hardline. The 900 antenna is side mounted on the west leg of the tower. The receive antennas are two homemade rib cages vertically stacked at 160 feet with an approximate gain of 7 dBd and are mounted on the south leg. We are using a half-wave power divider to combine the rib cages. We recently put up a tower-mounted Advanced Receiver Research RF-switched preamplifier. The receive system is fed with 1/2" hardline. There is a two meter ground plane at 10 feet for the control receiver. The repeater is made up of the following:

- ATVR-4 439.25 lvsb synthesized ATV receiver
- ATVC-4 plus controller
- TXA5-33 1.5 watt 33 cm exciter (8dB attenuation before amp input)
- Glenayre linear power amp (400 watts sync tips)
- Homemade 7-pole lvsb filter (434.5-440.5MHz)
- West Mountain Radio Rig Runner
- Sandisk digital photo viewer for the ID generator
- Homemade latch board for DTMF control of pre-amp on/off state and OSD video
- Icom VHF control receiver
- Repeater room camera on port 3

There are around seven to eight ATVers within the coverage area that have 900MHz receive capability.



The repeater has been performing well, as Brian K8IGU in Lucky, Ohio is getting into it almost every morning. Ron K8DMR reports seeing it up to P3 levels over in Jenison, Michigan approximately 80 air miles away using a 15-element beam at only 18 feet. The repeater is in normal repeat mode 24/7. I have also setup a BATC.TV streaming account under N8OBU ATV REPEATER, however, streaming is not on 24/7.

ATVQ



Two vertically stacked ribcage antennas at the 160-foot level on the tower



910.25 MHz transmit antenna on the left, 439.25 MHz dual ribcage receive antenna on the right.



Mast-Mounted ARR preamp



Antenna height is worth the climb

Liberty Middle School Balloon

- Bill WB8ELK



Liberty Middle School eighth grade science class students with their high altitude balloon

On April 13th, 2011 members of the UAH Space Hardware Club launched a balloon carrying eighth-grade student experiments from Liberty Middle School in Madison, Alabama to the edge of Space.

The Space Hardware Club (spacehardware.uah.edu) is funded mostly by Alabama Space Grant and is comprised of volunteer UAH (University of Alabama in Huntsville) students who do a variety of BalloonSat and satellite design projects. They often do outreach programs with local schools which is a great way to inspire students to pursue a career in space, science

and technology. This is a low-cost way to allow students to send their experiments into a space-like environment and allows them to run their very own space program right from their school.

This flight flew four student experiments from Ms Lyons' eighth-grade science class. They flew a variety of things to see what happened to them during their journey into the sub-zero temperatures and near-vacuum of the stratosphere.

One experiment consisted of markers, pens and even

lightbulbs to see if they still worked after the flight.

One payload was covered with solar cells and their performance was measured with an internal Arduino board that stored the solar cell data onto an SD memory card. After flying over 85,000 feet, being recovered about 60 miles downrange and banging around in my trunk for two days, it was still operating after 54 hours!

The other payloads contained things like bread, banana and apple slices, a calculator, a can of soda and a bag of popcorn.

One of the payloads had party balloons filled with a variety of gases to see which ones would pop during the flight.

The flight carried two APRS transmitters as well as two high-definition camcorders. The Sony Handicam was in the last payload pointed straight up at the balloon and caught one of the party balloons popping near the top of the flight. It also recorded amazing video of the main weather balloon bursting at 85,782 feet.

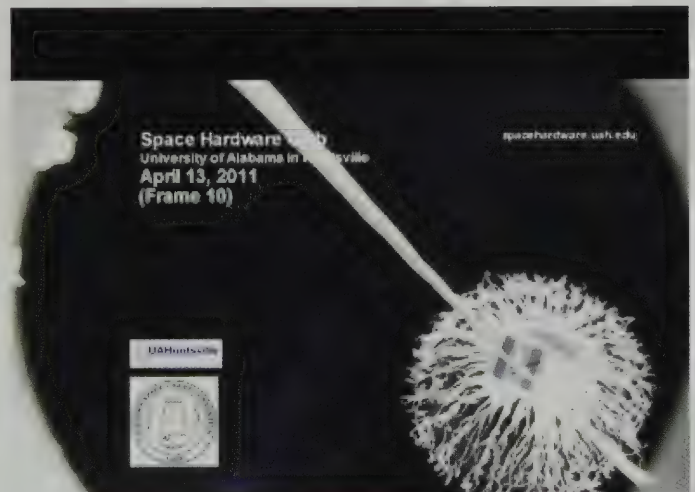
It was a perfect morning with clear skies and dead calm conditions. A large crowd of students came out to the ballfield to watch the picture perfect liftoff.

The balloon flew across the city of Huntsville with my horizon still camera payload taking beautiful snapshots of the city and nearby Lake Guntersville. After reaching peak altitude, the balloon popped and everything parachuted down to land in a pasture just each of Geraldine, Alabama.

Jason Winningham KG4WSV and a group from the Space Hardware Club tracked the balloon via APRS and made the relatively easy recovery from the pasture. Trust me, it's usually not this easy. We often have to climb tall trees and hike through the wilderness. But every once in awhile Mother Nature lets us off easy.



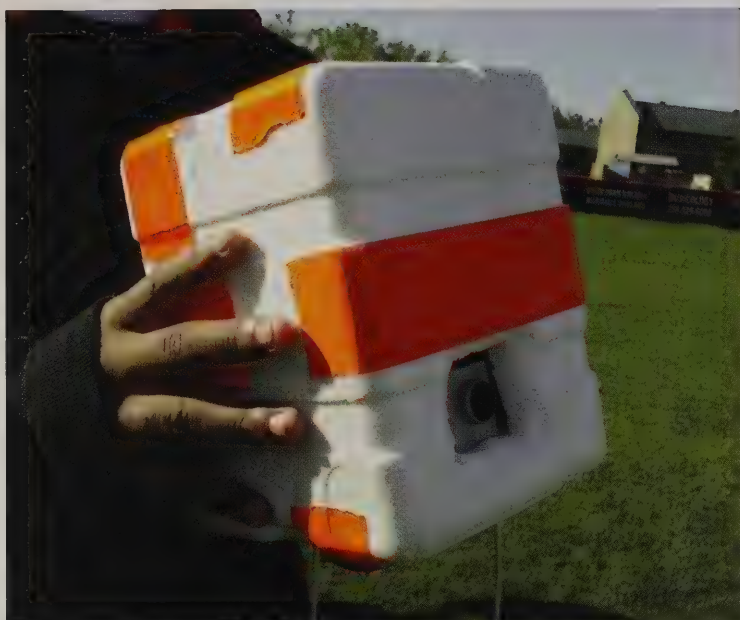
Liberty Middle School students prepare for liftoff of their science experiments



Dramatic footage of the balloon burst at 85,782 feet as captured by the UAH SONY Handicam

Cont. on Page 14





Above and Right: The Hero HD camcorder payload



The GoPro Hero HD camcorder

I have flown quite a variety of small camcorder units on balloons. The units I have had the most success with are the Flip Ultra pocket camcorder units. Although they make an HD version, most of my previous flights have used the standard definition modes. I have filmed some spectacular footage with the Flip, but they have a few drawbacks. Most notably the memory is built into the unit and there is no way to extend it with an external memory card. The limit for most Flip units is two hours record time and that usually means that I miss the last few minutes of a typical balloon mission and the landing can be the most exciting part. Also, the Flip Ultra HD version does 720p Hi-Definition but won't do 1080p. The last thing to note is that apparently the Flip series may be discontinued due to competition from the newer cell phones with built-in cameras.

After doing some shopping for a replacement camera I finally settled on the GoPro Hero HD camera (www.gopro.com). Fortunately, I had recently received my new camcorder unit just prior to this



The GoPro Hero HD hi-def camcorder

flight and managed to hitch a ride with the Liberty Middle School flight at the last minute. I quickly cobbled together a payload and hooked it near the parachute pointing out at the horizon. The neat thing about the Hero HD camera is that with its intended audience of extreme sports enthusiasts, it also is perfectly designed for high altitude ballooning, R/C airplanes, ATV Hatcams and would work well in



Student experiments just prior to liftoff

a tiny ATV portable system.

It weighs in at a mere 3.5 ounces (5.0 ounces with the optional backpack battery). The Hero comes in a nice rectangular package which makes mounting it into a styrofoam box quite easy. Although the Hero comes with a plastic housing to protect it from the elements, I opted to fly it with its lens exposed to eliminate fogging issues due to the temperature extremes it would encounter during the flight.

It can do video recording in a wide range of resolutions all the way up to 1080p mode. If you want to just take still frames with it, you can set it up to take 5 megapixel sequential stills from between 1 second to 1 minute intervals for as long as the battery lasts or until the camera memory card fills up. With the capability of using a 32 gigabyte SDHC card along with the backpack battery (which doubles the battery life), I was able to take thousands of photos at a 10 second interval for upwards of 5 hours during this flight.

Running the Hero at 1080p mode hi-def video with that same size memory card will provide you with at

least 3 hours record time which is more than enough to capture a full balloon mission from takeoff to landing.

I like the fact that there is no LCD screen built into the camera (an optional screen snaps on for viewing). This eliminates both weight and dramatically reduces current drain to allow longer record times. A simple LCD text screen on the front is easy to use to set the camera up and even allows you to invert the image if you want to mount the camera upside down. Another great feature is the “one-button record” option. I can start it up in a preselected mode from the outside of my payload just by pushing on the front-mounted power on button.

One more nice feature that is perfect for ATV use is its capability to hook a cable to the camera to output live video to a video transmitter at the same time that it is recording to the SDHC card.

Keep in mind that the lens is fixed and depending on the mode will be very wide angle. As a result, you’ll have to make sure the camera lens extends beyond the edge of your container (which explains what Gary Dion N4TXI called the “looking out the door of a styrofoam igloo” look of the photos starting on page 16.

The still frames shown on the next two pages were taken by the Hero HD payload from launch to landing at 10,000 foot intervals.

The camera was exposed to temperatures of -40 deg C and below and managed to not only survive but was still running when it was recovered from the pasture.

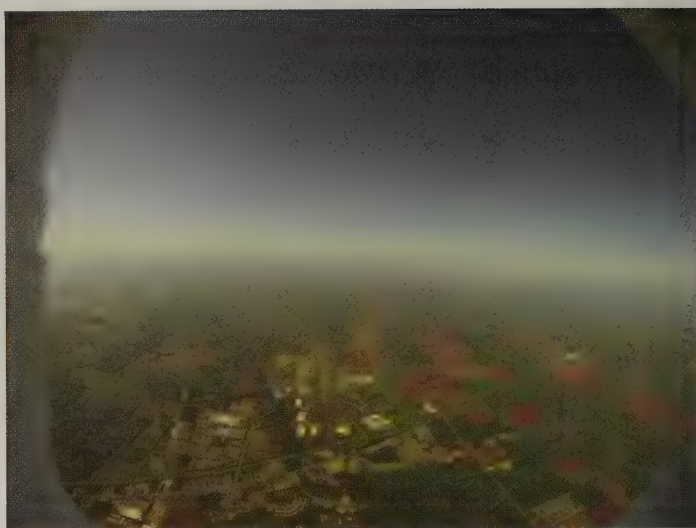
ATVQ

More photos on Page 16





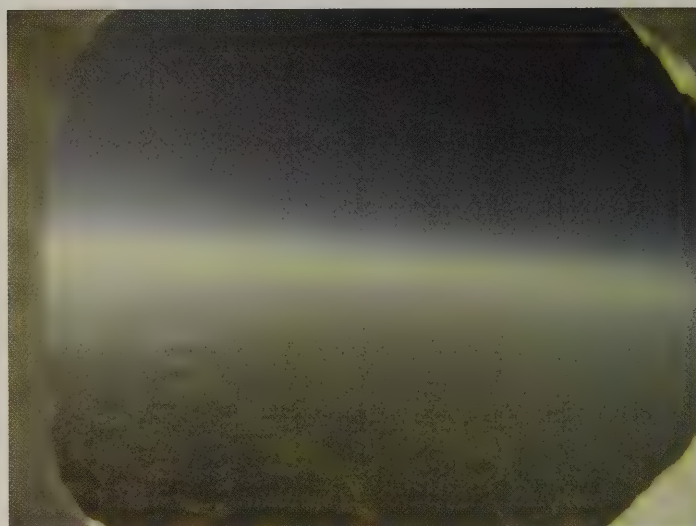
Liftoff



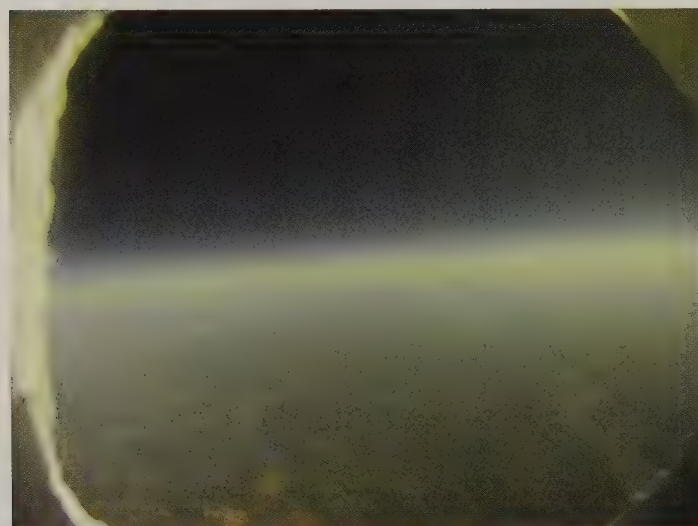
10,000 feet over HSV Int'l Airport



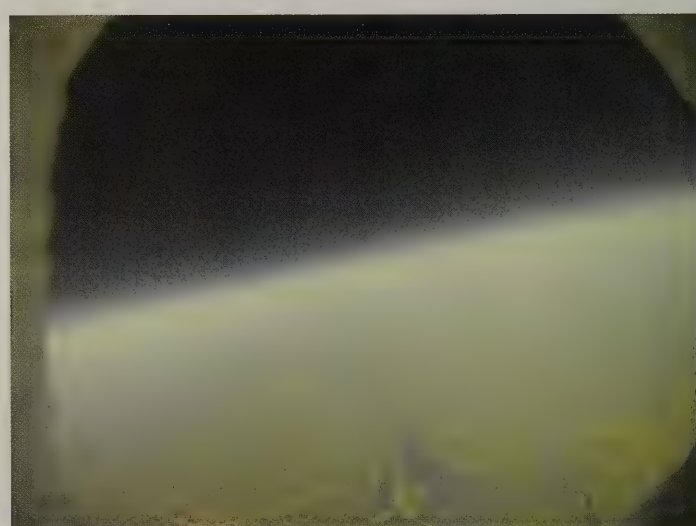
20,000 feet



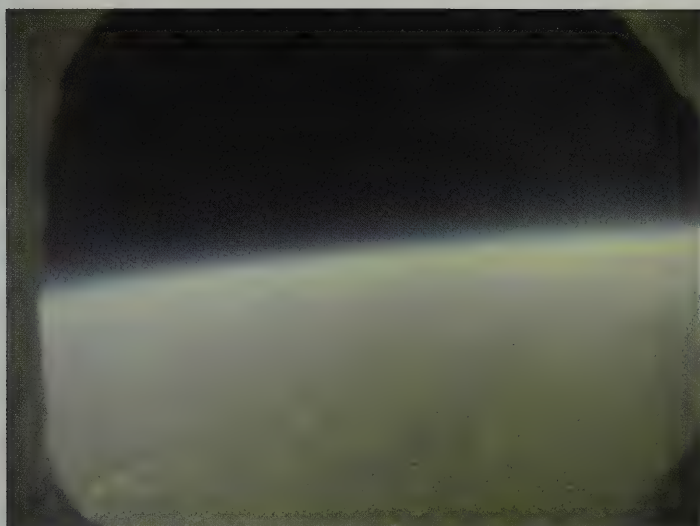
30,000 feet



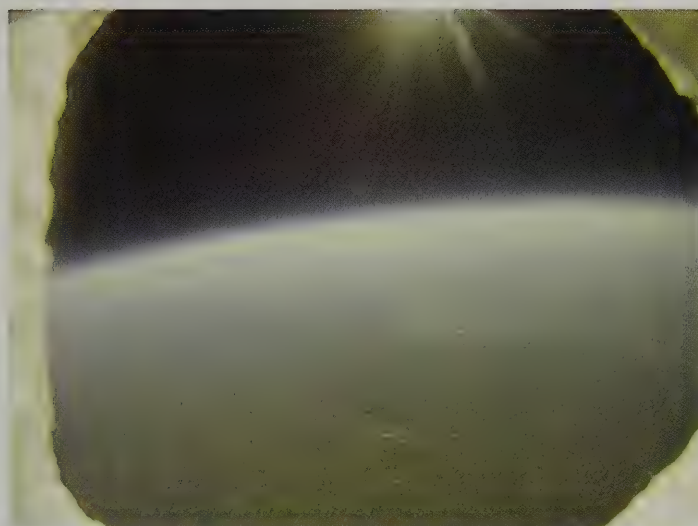
40,000 feet



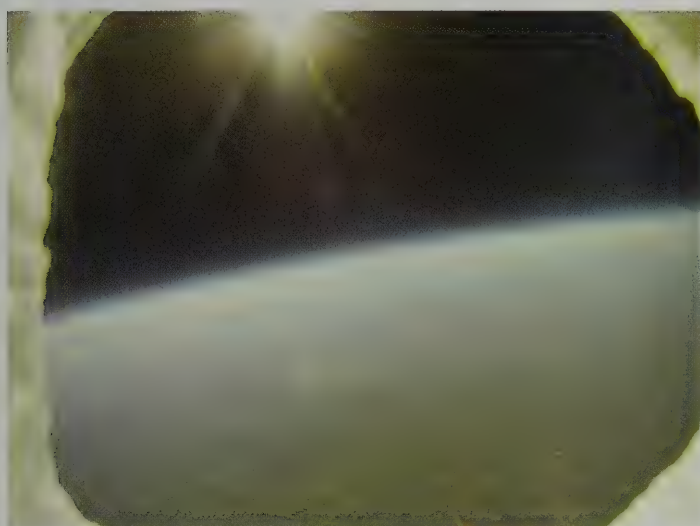
50,000 feet



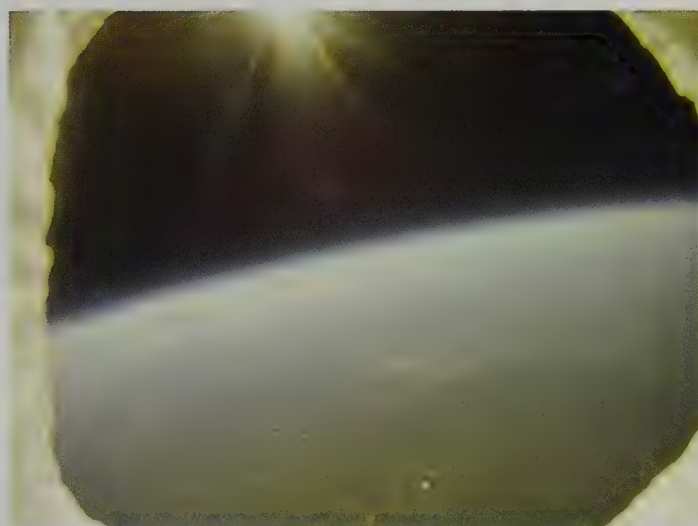
60,000 feet



70,000 feet



80,000 feet



85,000 feet



200 feet - about to land



4 feet - taken a split second before landing

Litchfield ATV Banquet 2010

- Scott Millick K9SM



Twenty-Fifth Annual ATV banquet at the Ariston Restaurant in Litchfield, IL

TWENTY-FIFTH ANNUAL ATV BANQUET

A beautiful 45-degree day provided a pleasant trip for those traveling to the Silver Anniversary celebration of the Central Illinois/St. Louis Area Amateur Television Club's banquet at the Ariston Restaurant in Litchfield, Illinois. This location serves as a central meeting point for club members attending from the Bloomington, Mt. Vernon, Springfield, Champaign, Canton, Macomb, Illinois and St. Louis, Missouri areas



Memories of times past

This dedicated group of ATV operators once again arrived for another evening of renewing friendships and meeting new members with 42 members attending this year.

As members arrived the talk about ATV openings, contesting, and equipment reverberated throughout the room.



K9SM on left with K9IDQ accepting the special award for K9KKL who was unable to attend

The group was called to order at 5 PM by Scotty K9SM and after a few announcements the clatter of dishes, glasses, utensils and chit chat continued throughout the course of a great meal and delicious desserts.

As this was the 25th anniversary of the banquet there was no ATV Operator of the Year awarded and no formal program given.

Instead it was time to remember about times past and those who were active in the early days of ATV and their stories. Also remembered was those who are no longer with us and some of the early equipment that was used.

The original banquet began in the same restaurant location as it is held today. There were 12 people present: K9SM, W9JF (WB9ENR), W9BH (KB9DU), KD0LO, K9KKL and WB0ZJP (deceased) and their

wives. Everyone present was in an area from Springfield, Illinois to St. Louis, Mo. It expanded to include other areas through the years until today where it encompasses about a 120 mile radius from Litchfield, Il. Many great programs were presented, most by the members themselves. Two examples were a demonstration of mechanical TV by Peter Yanczer K0IWX and a talk about phasing by Bob Heil, K9EID. It brought back a lot of memories of the past and those who participated in ATV.

A Trivia Contest was held with the tables competing with each other to answer 25 questions presented by K9SM about ATV, amateur radio and the club. Every table was a winner as it also provided a time for reflection about the hobby and those who are members.

The famous prize drawing followed which included a Bird wattmeter. As always the drawing provided a lot



K00Z and a whopper of a story.

Cont. on Page 20



of fun and laughs. The first person's name drawn had their choice of any three of any of the 150 plus prizes on the first round. After that every person whose name was called could select 3 prizes from the prize table or take a prize from someone who had already chose one. That person then selects a replacement from the prize table. This led to some of the main prizes changing hands over a dozen times. Everyone left with at least four prizes. The Bird wattmeter was won by Mel Whitten K0PFX from St. Louis MO.

After the drawing more visiting followed and farewells were said. Everyone made their way home and are looking forward to the next banquet scheduled for November 13, 2011.

The above information is dated 4-10-11. Further information or questions should be directed to:

Central Illinois/St. Louis Area ATV Club
Scott Millick K9SM
222 N. Jackson St.
Litchfield, Illinois 62056
217 324-2412
smillick@wamusa.com



Which Prize to Take?

ATVQ

Thinking Digital ATV?

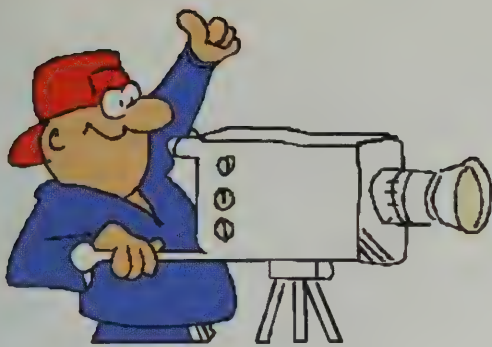
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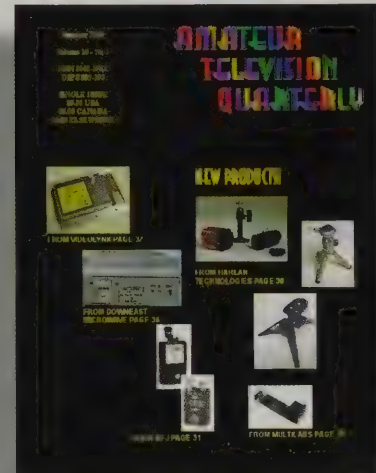
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Volume II is a mammoth book with 292 pages of technical material. More than 40 authors present over 90 technical projects and theory topics to fully acquaint anyone from novice to expert in the how and what of TV, video, and ham TV. Divided into 11 chapters, the book presents tested projects for all areas of interest in ham TV including antennas, amplifiers, repeaters, receivers, transmitters, video accessories, and more!

Volume II is sold out in the paper version, but available on CD.

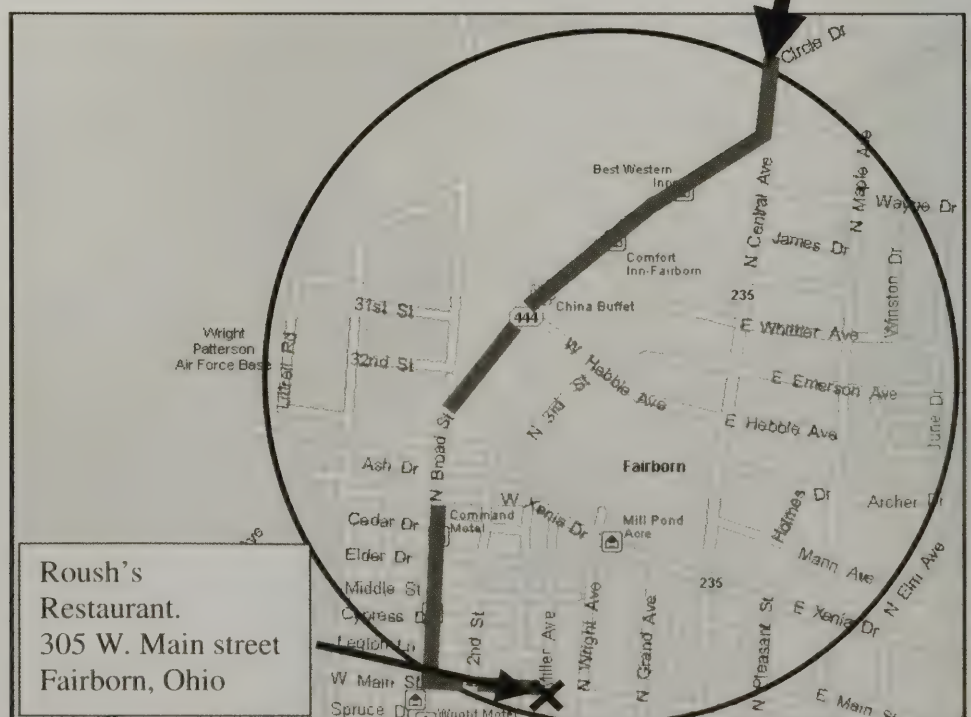
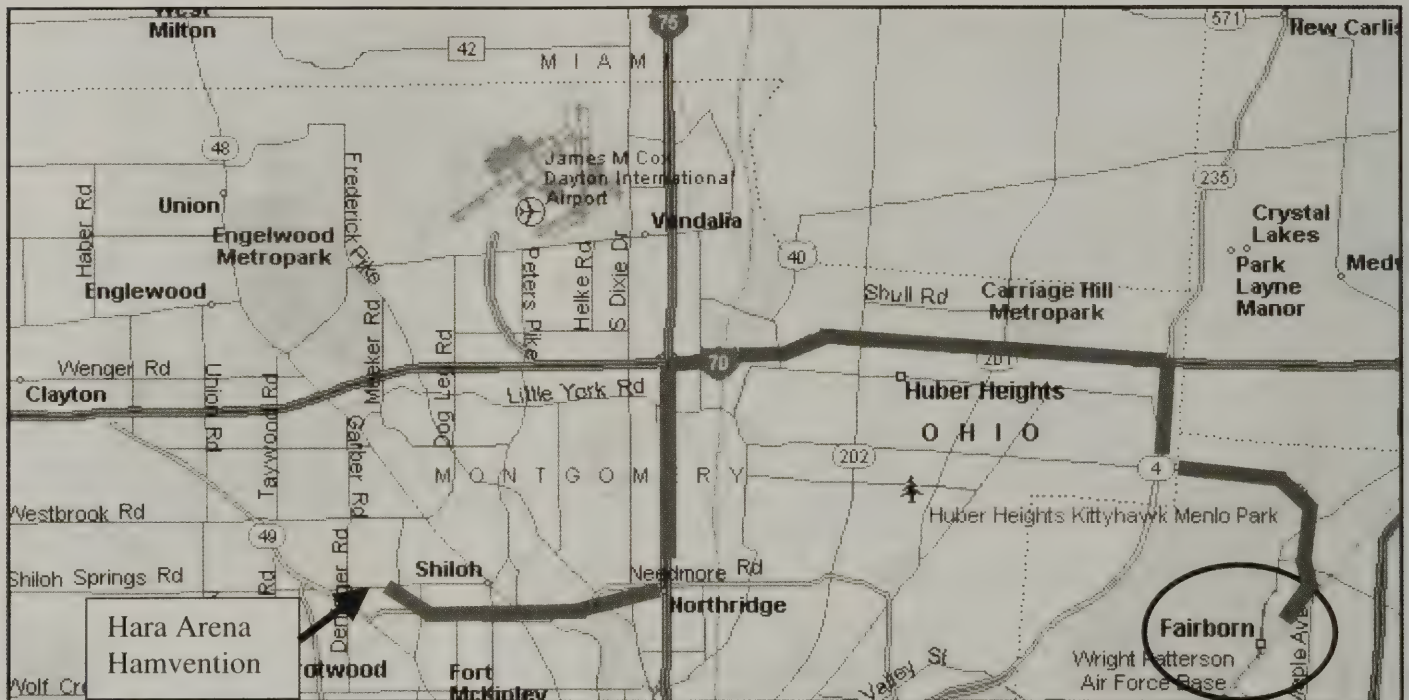
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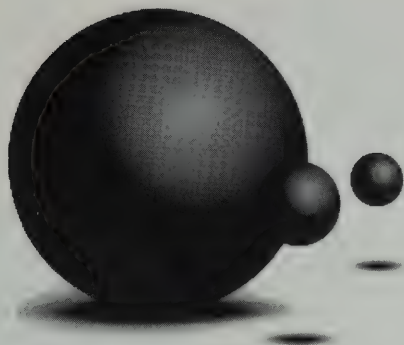
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ATV Friday Night Dinner 2011 The ATV Friday night dinner and discussion will be held on Hamvention Friday from 7 till 10PM at Roush's Restaurant 305 W Main St. in Fairborn, OH 45324 (at the north end of Wright Patterson airfield runway). The dinner menu is varied, moderately priced and ordered separately. We will enjoy a sit down dinner then have speakers talk about various ATV topics. We will also include door prizes for those present. The meeting terminates at about 10PM.

Directions: Take I-75 north then I-70 east. Exit SR 235/ SR4 south (Fairborn exit). South on 235 about 1 mile then left on Chambersburg Road (east & still SR235 past airport runway). Right on N. Broad Street for about 10 blocks. Turn left on W. Main Street for 3 blocks to Miller Ave. Roush's is on corner of W. Main and Miller. Parking in rear. Roush's Restaurant. 305 W. Main street, Fairborn, OH 1-937-878-3611 GPS (39-49-19-N) X (84-01-30-W)





Harlan Technologies

Name Tags by Gene

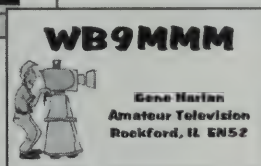
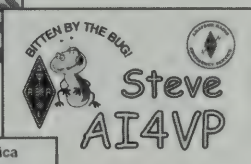
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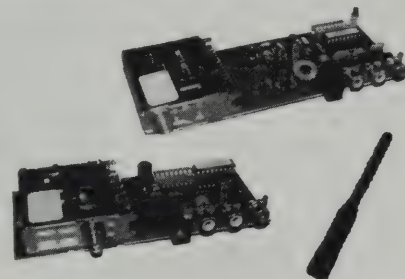
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ATN-CA Winter Meeting

- Mike Collis WA6SVT *Photos by George AC6RB*

The California chapter of Amateur Television Network held it's annual winter brunch and business meeting February 19th, 2011 in Irwindale California. We started with brunch at 11AM with 26 members from the California chapter and three members from the Arizona chapter.

The meeting was brought to order at 12 noon by Don Hill KE6BXT the ATN-CA president. Repeater system reports were made by Mark W6MAF, Rod WB9KMO, Allan W6IST, and Mike WA6SVT. Peter KD7OIW the Arizona chapter president was introduced along with Bob W8ARZ and Tom KE7QK that drove seven hours to attend the meeting from Phoenix Arizona. Peter then gave a report on the Arizona chapter and their repeater system.

We had a break and dues renewals were made during this time too. Following the break, Don KE6BXT presented two presidents awards this year for technical service at our repeater sites. Mark W6MAF and Bob W6KGE received the awards. Mike WA6SVT passed out ATVQ's first all color print magazines to all and talked about the magazine.

Nominations were taken for officer elections and each nominee gave a short talk. Elections followed and Our new officers are; Tom Board WB6HYH President, George Migliarini AC6RB V.P. The Sec/Tres is appointed, Mike WA6SVT fills the post.

Some members brought equipment to show to the group. Bob W6KGE talked about the new 3380 MHz FM transmitter he built up and helped install with Chuck WA6FGK and Allan W6IST for Oat Mountain's new FM output to compliment the existing 919.25 MHz VSB output. Bob talked about the coverage on 3



GHz FM and how much better it was than the higher powered VSB signal on 919 MHz.

We all had a great time socializing at the meeting and look forward to our summer BBQ social later this summer.

73,
Mike WA6SVT

ATVQ



New ATN-CA officers from left: Tom WB6HYH President, George AC6RB Vice President, Mike WA6SVT Sec/Tres and Trustee of W6ATN and Rod WB9KMO Trustee of Santa Barbara repeater.

bob

basic overlay board

Decade Engineering's fourth generation low-cost video information overlay generators make last century's 'OSD' products look antique.

BOB-4 and XBOB-4 let your microcontroller or PC display text and vector graphics on standard TV monitors. With huge user-definable character sets, BOB-4 also supports bitmap graphics and multiple languages. BOB-4 generates background video on-board, or automatically genlocks to your video source and superimposes graphics over the image. Printable characters and commands drive BOB-4 through a fast RS-232 style port, much like a serial terminal or printer.

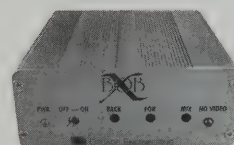
NTSC and PAL video standards are supported via software command. The free BOB-4 Conscripitor PC program simplifies configuration and font management.



- Simple hookup; requires just 9-12VDC, RS-232 data, video I/O
- Prints plain ASCII text in default configuration
- Display density up to 480x240 (NTSC) or 480x288 (PAL)

Display text and graphics from your PC on standard TV monitors.

- Stand-alone operation for video ID, target reticle, etc.
- Automatic vertical scrolling
- Text crawl (single-line smooth horizontal scroll)
- Expanded memory for custom fonts & bitmap graphics

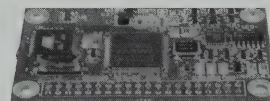


bob-4h

- Tiny and rugged; industrial temperature option
- Simple hookup; requires just 5VDC, data, video I/O
- Asynchronous 'TTL-232' and SPI control ports
- Prints plain ASCII text in default configuration

Display text and graphics from your microcontroller on standard TV monitors.

- Display density up to 480x240 (NTSC) or 480x288 (PAL)
- Text crawl (single-line smooth horizontal scroll)
- Off-board memory expansion for fonts & bitmap graphics
- Software-controlled digital outputs (5)



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A POWER SUPPLY FOR THE IONICA 3.4GHz RF AMPLIFIER

By Bob Miller, W6KGE

As part of an upgrade to our Oat Mountain ATV repeater, we recently installed an Ionica 3.4 GHz RF amplifier as part of our FM ATV transmitter.

Many years ago, Ionica was licensed, to provide Fixed Wireless Services, in parts of the UK. After producing a number of RF amplifiers for 3.4 GHz, the license was re-assigned. As a result, a large number of amplifiers were no longer needed. They are often available on the surplus market. The amplifier produces approximately 15 watts output with less than 7 milliwatts of drive.

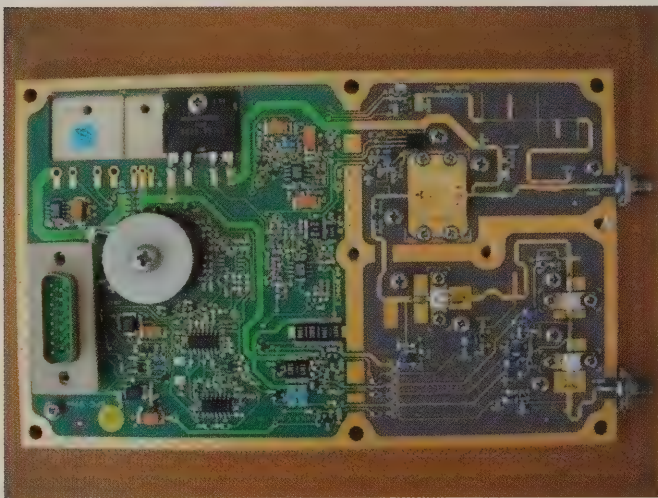


Photo of Ionica 3.4 GHz RF amplifier with cover removed. Left side is power and control, right side is RF section. RF input is shown at bottom right.

Amplifiers of this type, typically require several different regulated voltages. Power is supplied by a standard 15 pin D-connector.

Pin 1 = Used for output of an 'on-board' RF power detector. (approx. 6.5 volts at full power output).

Pin 2,3 = Unconnected.

Pin 4 = +5VDC. (Push-to-Talk / Mute function?).

Pin 5 = -12VDC.

Pin 6,13,14 = "0 volts". (Negative return for the major +10VDC power.)

Pin 7,8,15 = +10VDC power.

Pin 9 = Ground return for RF power detector.

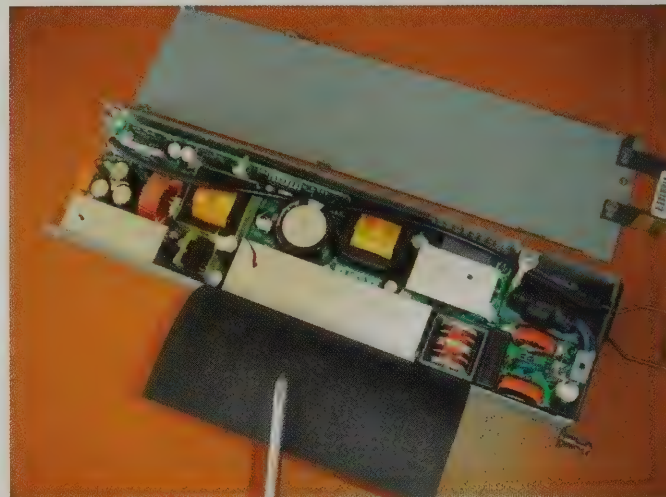
Pin 10 = Output from on-board temp. sensor.

Pin 11 = Output from on-board error detect.

Pin 12 = +12V @ 30mA. (must not be >12VDC)

The power supply provides all the necessary voltages. More importantly, it must never supply the 10 vdc if the bias voltage is reduced or lost.

To reduce supply complexity, a 12VDC 18A switching power supply is used for the main dc power to the regulator and control portion. Almost any good quality supply will work. The DC supply is shown here with cover removed.



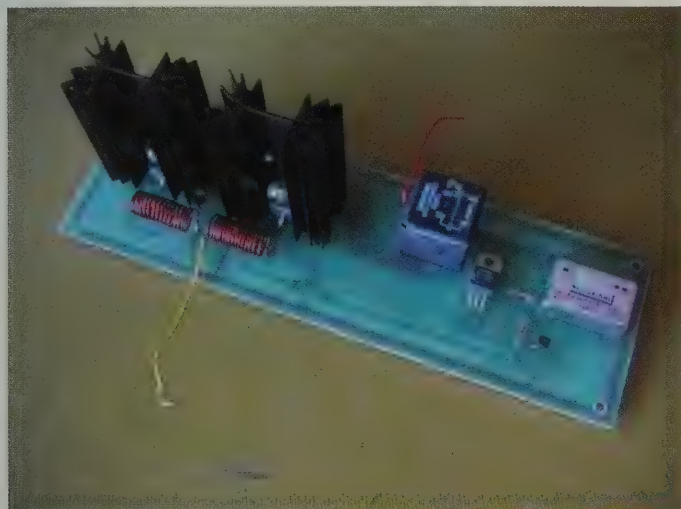
From here, look at the schematic. Because I designed the supply to match the devices available from my 'junk box' a bit of explanation is in order.

12VDC power from the main supply is fed directly to a DC-DC converter. The schematic uses the converter I had available. As a result, I had to add a negative 12 volt regulator to the circuit. (A DC-DC converter designed for +12VDC input and regulated -12VDC output would work also eliminating the need of the 79L12). Regardless of which method is used, the output of this portion of the circuit is what controls the power relay that then controls the 9.6VDC output to the RF amplifier.

Two Linear Technology LT1084CT regulators are used in parallel in this circuit. To insure current sharing between the two regulators, two approximately 0.015 ohm resistors are made by air coil winding (2) 18" of #20 enameled copper wire.

(Editor's note; this power supply will also work very well for powering up used ITFS/MMDS FET power amplifier modules for use on 2.4 GHz ATV, Mike WA6SVT)

Because of my 'junk box' parts, I used a lot of surface mount 47 uF tantalum capacitors in parallel at various locations on the schematic. These can be replaced with your capacitor choice with at least the total amount of combined capacitance shown.

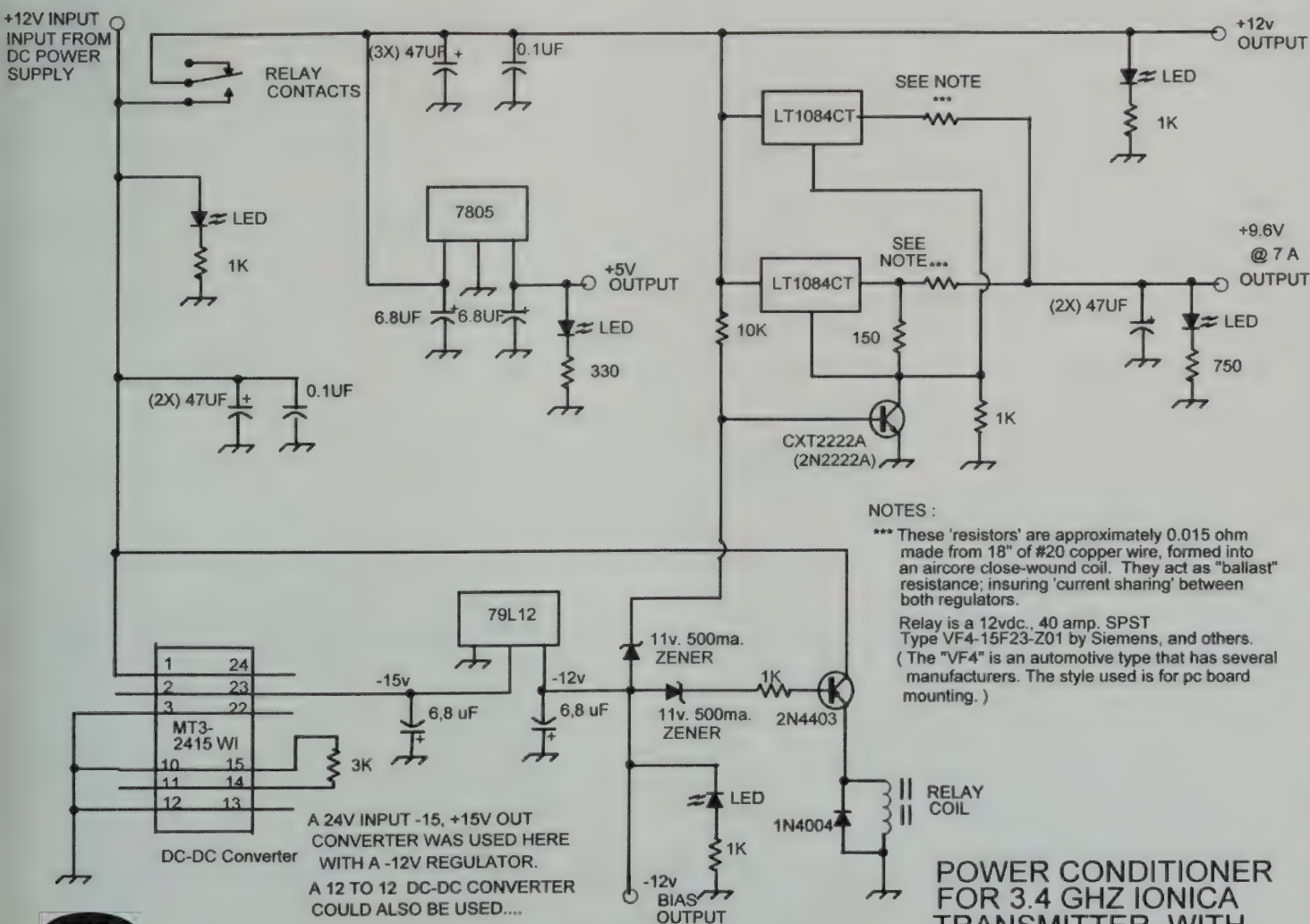


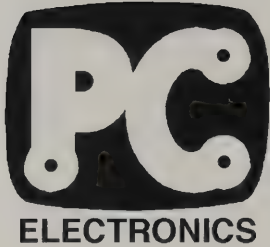
The bottom of the regulator board showing the heat sinks, copper coil resistors, power relay, smaller regulators and the DC-DC converter module.



The top of the regulator board, showing the voltage status LED's, parallel surface mount tantalum capacitors and the extra wide copper foil traces for the higher current portions of the circuit. (A portion of the Ionica RF amp is shown at the bottom right of this photo with heat sink attached).

A forced air fan is used to cool the 12V switching power supply, regulator and control board.





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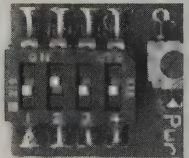
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Videolynx VM-70X Transmitter Quick Start

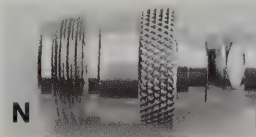
Your transmitter comes set for around 1/2 Watt pep output which allows you to connect up DC power and RF Out to almost immediately put a signal out on the air. Connect a red insulated #18-22 wire (Radio Shack 278-567) to the 12V solder pad and a black one to the adjacent Gnd solder pad. Always double check that that red is connected to the positive output of the 11 to 13.8Vdc power source, you can damage the module if reversed.

You can use batteries, but a regulated 13.8 Vdc power supply works best. Connect a 50 Ohm dummy load to the RF Out SMA jack or 70cm whip antenna that has a SMA plug on it. Set the frequency digiswitch to 427.25 MHz and internal video: 2 is ON (1) all others OFF (0). Connect an external 70cm antenna to a TV set to *cable* channel 58 or downconverter to 427.25 MHz.

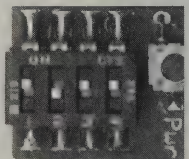


427.25 MHz Test
0 1 0 0

We stock a F male to N jack adapter to connect your TV directly to low loss 1/2" size 50 Ohm coax with N plugs - 50/75 Ohm mismatch is negligible. We also stock a SMA male to N jack adapter to connect the 50 Ohm 70cm antenna coax to the VM-70X.



In order to connect up your camera and line audio, you can get BNC and RCA jacks from Radio Shack or Mouser and run a shielded cable from each to the Vin video and Ain audio input solder pads on the VM-70X. It is easiest is to just cut off one end of a existing BNC and/or RCA shielded cable that mates with your camera jacks. Strip the cut end about a half inch and solder the centers and Gnd shields to the solder pads. To transmit the video from the camera instead of the internal test video pattern, reverse the 4 digiswitch settings with 2 off and the others on.

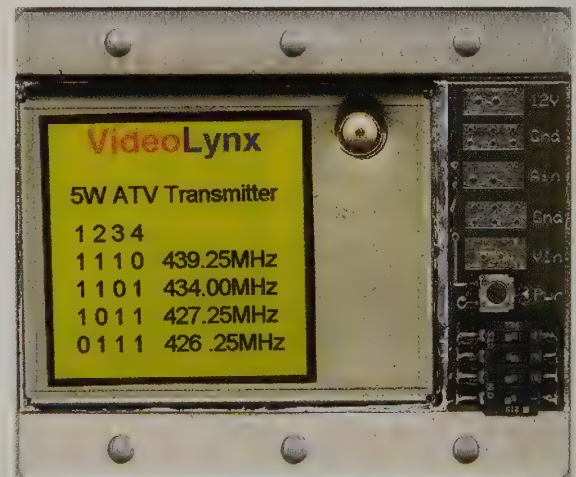


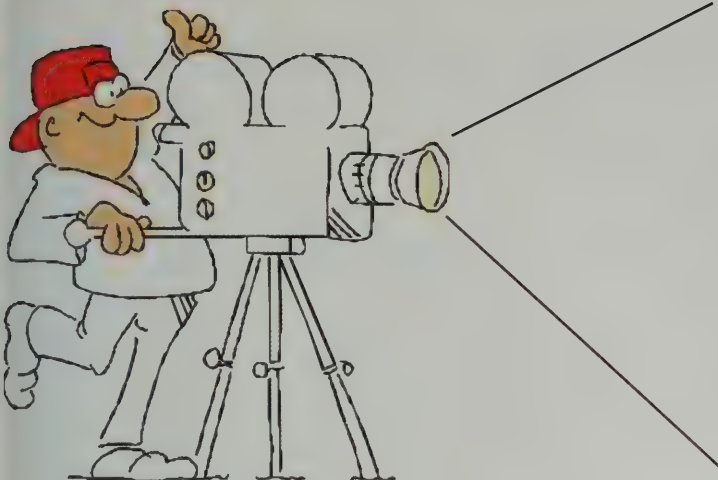
427.25 MHz Cam
1 0 1 1

Turn on the DC power and look for the two white vertical bar test pattern and tone on the TV for no more than 5 minutes unless you have mounted a sufficient heat sink to the bottom plate - see the other application note pages. A one to two second delay for the RF to come up is normal. With inside antennas, you may also note some picture instability in the picture due to TV overload and/or multipath. If you are receiving the test pattern and audio, turn off the DC power and reset the frequency digiswitches for transmitting video from your camera. Cameras and mics can be RF susceptible so experiment with keeping the camera far enough away from the transmitting antenna.

Before connecting to a good outside 70cm antenna with a SWR of no more than 2:1, find out on your local two meter ATV talk back frequency what ATV antenna polarity is being used and which of the 4 ATV frequencies is used in your area - 144.34 and 146.430 MHz simplex are common. Only two 70cm ATV frequencies are useable at any given time and must be separated by at least 6 MHz to prevent interference. Also if FM voice repeaters use a frequency below 444 MHz for input or output, they can interfere with reception on 439.25 MHz ATV.

Establish contact with a local ATVer on 2 meter voice that has a strong simplex signal to you. This is an indication that they can receive your 70cm video. Rotate your directional antennas for best received picture coordinating on 2 meters. Don't forget to ID either by speaking into the camera mic or with a call letter card in view every 10 minutes for long transmissions and at the end of the transmissions. Once everything seems to be working well with your set up, you can consider packaging the module and heatsinking so you can crank up the power - check our Plug and Play ATV and app note web pages.





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SPRING	APRIL 1	APRIL 15	MAY 1
SUMMER	JULY 1	JULY 15	AUGUST 1
FALL	OCTOBER 1	OCTOBER 15	NOVEMBER 1

AD RATES		
Effective November 19, 2004		
INSERTIONS PER YEAR		
SIZE	1-3	4 up
FULL PAGE COLOR	\$650	\$500
FULL PAGE B&W	\$160	\$140
ADDITIONAL COLORS/PAGE	\$100	\$100
1/2 PAGE B&W H or V	\$110	\$80
1/4 PAGE B&W H or V	\$85	\$55
1/6 PAGE B&W H or V	\$55	\$38

Multi-page ads are billed at the combined rate based on frequency.

Covers are reserved for COLOR ads.

All typesetting and layout charges for non-camera ready ads will be added.

Covers II, III, IV \$30 extra.

If negatives are not provided for color ads, add \$50.

While we will try to adhere as close as possible to the above dates, we reserve the right to adjust as needed.

If material is going to be late, please call to check if it will meet our schedule. We will try to accommodate everyone as best as we can.

Camera ready art or negative film right reading down is acceptable.

Trim Size: 8 1/2 x 10 7/8
Bleed Size: 1/8" beyond trim
Live matter: 1/4" within border

ATV Quarterly reserves the right to reject any advertising which is not in keeping with the publishers standards. Previous acceptance of any ad will not prevent ATV Quarterly from exercising the right to refuse the same advertisement in the future. Advertising orders are subject to the terms on the current rate card. Advertisers assume all respon-

sibility and liability for any claims arising from advertisements and will protect the publisher from same.

ATV Quarterly will position ads in ATVQ at its discretion except in the case of preferred positions specifically covered by contract or agreement.

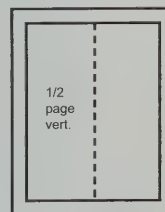
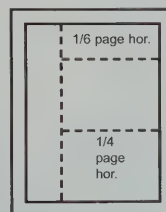
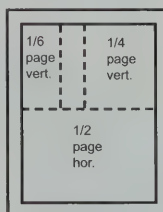
If, for any reason, the publisher fails to publish an advertisement, it will not be liable for any costs or damages, including direct or consequential damages.

Terms: All accounts not pre-paid are billed net 30 days. All accounts over 30 days are billed at 1 1/2% per month. Prompt payment is always appreciated.

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AD SIZES	VERTICAL		HORIZONTAL	
	Width	Height	Width	Height
FULL PAGE	7"	10"	---	---
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1/4 PAGE	3 1/2"	5"	5"	3 1/2"
1/6 PAGE	2 1/4"	5"	5"	2 1/4"

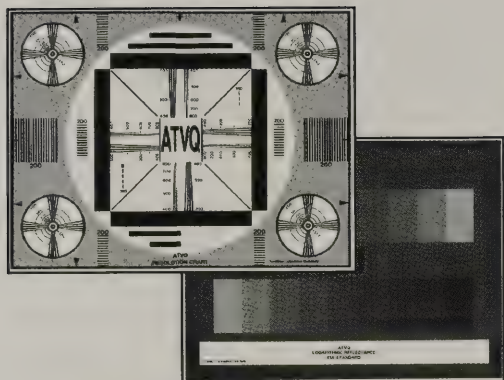


Amateur Television Quarterly

published by ATV Quarterly
P.O. Box 1594, Crestline, CA 92325
tel (909) 338-6887

Internet: <http://www.atvquarterly.com> email: wa6svt@atvquarterly.com

FULL COLOR TEST CHART



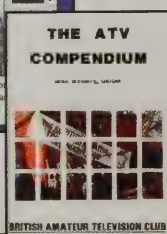
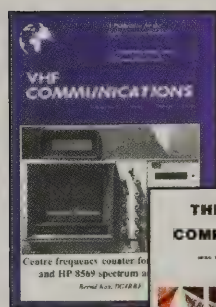
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A quarterly publication from KM Publications in England that is a must for the technically minded. Lots and lots of articles for those that build projects in the VHF and above range.

One year \$44.00 (for 2008)

The ATV Compendium

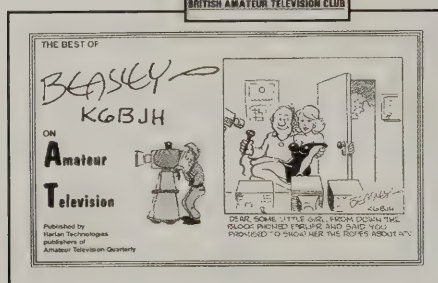
Published by the BATC. A great technical book with articles applicable to UK and US systems.

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The Best of Beasley - K6BJH - On Amateur Television

A collection of all the cartoons that have appeared in ATVQ over the years plus many more.

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Previous issues of ATVQ

There are many super articles in the previous issues of ATVQ. We keep a list on www.atvquarterly.com what we still have in paper. You will also find a complete index of articles so you can find just what you want.

Single issues \$4.95 - Special 10 issues for \$30.00 - Shipping in the USA included!



ATVQ now on DVD

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- Includes Best of Beasley



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- (\$4 shipping to Canada \$8 DX shipping)

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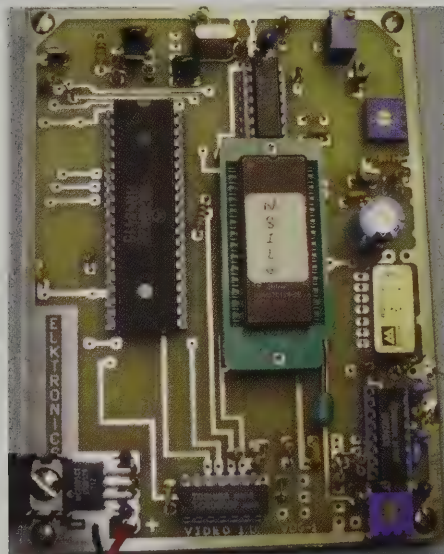
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email: wb8elk@aol.com

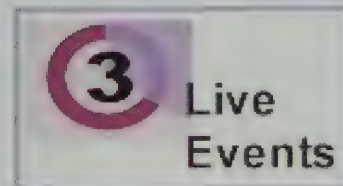
www.elktronics.com

\$150 (includes 4 graphic screens)

\$20 for additional ID PROMs



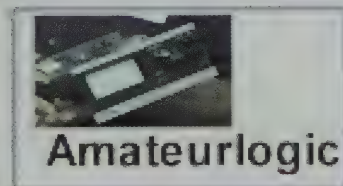
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www.batc.org.uk

www.batc.org.uk/forum

Dayton Hamvention ATV Activity Preview

-Art Towslee WA8RMC

This year there will be a variety of activities at Dayton of interest to the ATVer. Below is a topic summary.

Friday Night ATV Dinner / Discussion will be held on Friday May 20, from 7 till 10PM at Roush's Restaurant 305 W Main St. in Fairborn, OH 45324 (at the north end of Wright Patterson airfield runway). The dinner menu is varied, moderately priced and ordered separately. We will enjoy a sit down dinner then have speakers talk about various ATV topics followed by door prizes for those present.

Directions: I-75 north then I-70 east. Exit SR 235/ SR4 south (Fairborn exit). South on 235 about 1 mile then left on Chambersburg Road (east & still SR235 past Wright Patt. airport runway). Right on N. Broad Street for about 10 blocks. Turn left on W. Main Street for 3 blocks to Miller Ave. Roush's is on corner of W. Main and Miller. Parking in rear. (see map on page 22).

Saturday FAST SCAN ATV Forum

will be held at Hara Arena on Saturday May 21 at 3:30PM in room 2. The speakers will present a variety of short ATV related topics. The tentative schedule is as follows:

Art Towslee WA8RMC - short introduction.

Gordon West WB6NOA – LIVE from Dayton, ATV net THEME ideas that work ! From Mad Hatters to creepy cams.

Mike Collis WA6SVT and Bill Brown WB8ELK - ATVQ Magazine overview.

Lou McFadin W5DID - DATV Space Station project and Oscar satellite activities.

Jess Nicely KB8OFF - ATV progress in the Dayton, Ohio area.

Mike Collis WA6SVT - ATV repeater linking in southern California.

Chris Oesterling N8UDK – Boy Scout ATV rocket launch.

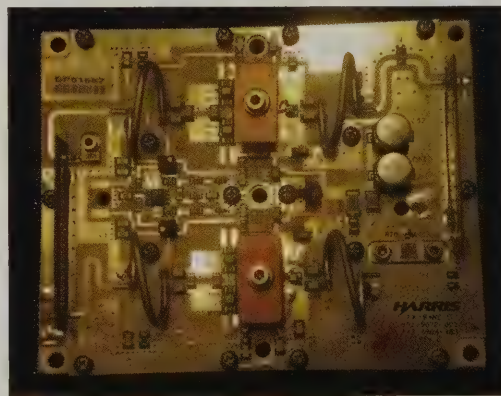
See you there.

...WA8RMC

ATVQ

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Complete module - \$400



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To order contact Mike WA6SVT:
wa6svt@aol.com or **(909) 338-6887**.

Thanks to all the fine stores that carry Amateur Television Quarterly

Burnaby Radio Comm Ltd. 4257 E. Hastings St. Burnaby, BC Canada V5C 2J5	Ham Radio Outlet 2492 W. Victory Bl. Burbank, CA 91506
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Ham Radio Outlet 6071 Buford Hwy Atlanta, GA 30340	The Radio Place 5675 A Power Inn Rd. Sacramento, CA 95824
Ham Radio Outlet 224 N. Broadway Salem, NH 03079	Do you know of a store that would like to carry ATVQ? Please let us know and we will contact them.

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**Please mention that you saw it in
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CONTRIBUTORS GUIDE

Preferred method of receiving articles is from **Microsoft Word**, **Open Office** or **ASCII Text**, followed by **typewritten** or **hand written** (clearly). Diagrams or pictures (B&W or Color) can be sent in hard copy, or if you scan them in, save to TIF, JPG or BMP formats (actually I can read about anything). If you send a computer disk, make sure it is PC (not MAC) format. When sending in digital photos or scanned photos, please send us the highest possible resolution for best quality when we print it.

Article submissions can be sent to:

Bill Brown WB8ELK
107 Woodlawn Dr.
Madison, AL 35758

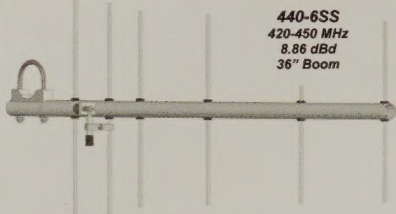
or to our email address: wb8elk@atvquarterly.com
Also note our web page address: <http://www.atvquarterly.com>

The New **M2** AMERICAN Antenna

WE'RE YOUR ATV ANTENNA SOURCE

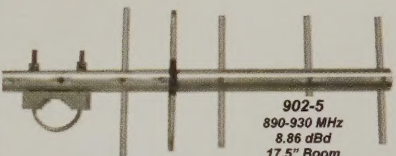
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MSRP \$ 78.00

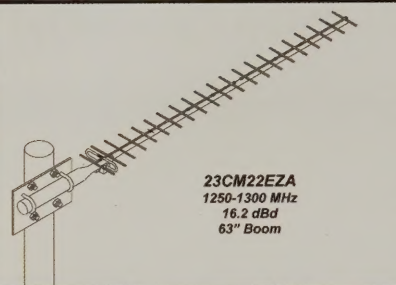


440-6SS
420-450 MHz
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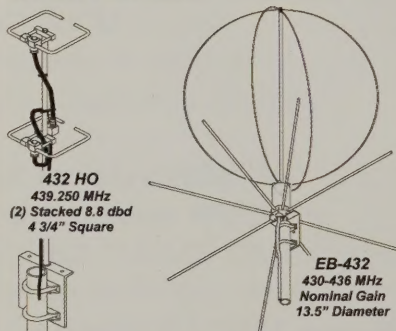


902-5
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Payment for Technical Articles

ATVQ will pay for certain articles that it publishes. I will outline the policy here, but it will be subject to change as needed to make sure that ATVQ continues to be an ongoing publication. ATVQ will pay \$25.00 for technical articles that are published and are a minimum of 2 pages. While this is not a great amount, I hope it will encourage more technical type articles to be written. Exceptions will be articles that are written by a manufacturer/seller of equipment that is being written about. While I do not want to discourage this type of article, the article itself is an advertisement of the product. Articles from clubs will be encouraged, and I would expect they would like to share their information with the ATVQ readership. Information gathered from the Internet will not be paid for and is mostly small filler items.

Ideas

Do you have an idea for an article that you've said to yourself that you wanted to write, but never did. Feel free to check with us to see if it is of interest, or write and send it in. No guarantees that it will get published, but if you don't try, you will never know. I'll be looking to see what you can do!

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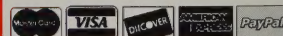
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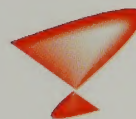
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"Michael Collis WA6SVT broadcast engineer and ATVer".

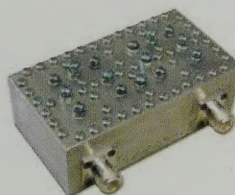
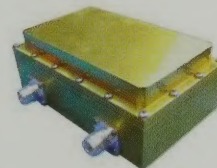
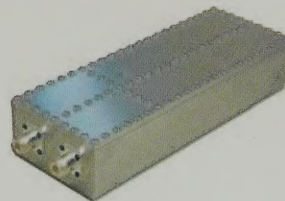
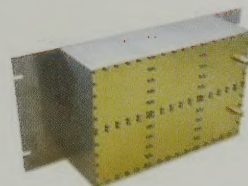
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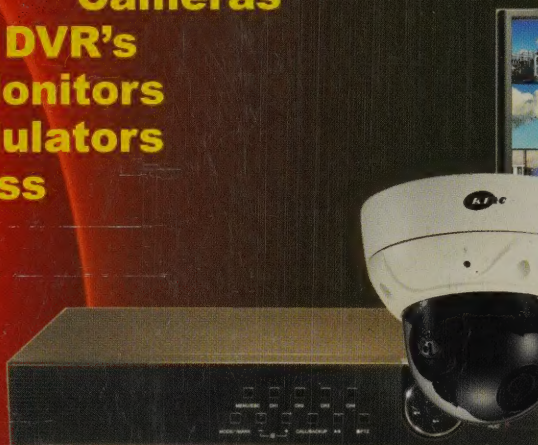


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